The OLPC Project: Usability Test

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Abstract

The OLPC (One Laptop Per Child) Project provides underprivileged school-aged children in developing countries with specially designed "learning" machines (the "XO" laptop). These machines are intended to provide students access to various new tools as well as a window to the rest of the world. Although the XO is in mass production and has been widely distributed, the open-source software at its core is under continuous development. Considering the target user-group of technologically inexperienced children, we examine the ease of use of the XO's "SUGAR" graphical user interface for elementary school children by focusing on the built-in "write activity" (application/program). The OLPC's ideal of collaboration is studied by observing how the children interact and perform in the shared activity.

The OLPC Project: Usability Test

The One Laptop Per Child (OLPC) Project has developed and produced a laptop designed specifically for use by underprivileged school-aged children. The "XO" laptop functions on a new, unique open-source operating system called "SUGAR" that features specially designed collaborative software. This software, also referred to as "activities", allow multiple users to work together on the same program from their own XO units. The XO laptop is a novel and unprecedented device that, at the time of this study, has been publicly available for less than six months. It is under continuous design and development and there are limited data available on the effectiveness of the unique collaborative software at its core.

Purpose

This usability test had two objectives: one minor and one major. The minor purpose was to collect information about children's initial experiences and reactions to the OLPC XO laptop through a relatively guidance-free, hands-on session with the XO. The major focus of the study was to examine the effectiveness of the collaborative aspects of the SUGAR "Write" application between two users. Both of these evaluations were carried out to gauge how easy the XO was to use for children in addition to how well the networked activities supported their collaborative efforts. Data from both types of

evaluations was shared with the broader OLPC development community to support design improvements.

Problem Statements & Objectives

Hardware

- What aspects of the XO's physical design stand out to a child?

- How do children react to the XO's design?

Software

- Do children grasp the concept of a "shared" activity (working simultaneously on the same task)?

- Are children confused by two cursors present on the screen?

- Are children able to negotiate participation in a shared writing task without waiting for another user to complete a writing portion before them?

- Can a child use various font formatting functions of the Write activity?

- What aspects of the shared activity prevent children from collaborating?

User Profile

The OLPC laptop was designed and intended for school-aged children in underprivileged and lesser developed nations. Typically, these children are non-

English speaking, have limited resources (electricity, school supplies, monetary, etc.) and little to no experience with computer technology.

Our testing time-line, geographic location, and limited resources make it nearly impossible to recruit children who would truly represent the OLPC's intended underprivileged and inexperienced child users. However, we believe that evaluating children in the United States from the same age group who are familiar with one another in a learning/classroom setting will still yield valuable data. For this study, we are primarily interested in the usability of the SUGAR software's collaborative structure by children rather than specific aspects of the sample's demographics. While we understand that these aspects certainly affect the XO's usability we believe there is potential to uncover certain "universal" issues that may exist in the software structure that can be addressed for the benefit of all intended users.

The target age group for the OLPC project is 6 to 16 year old school-aged children. Our initial goal was to recruit and evaluate 9 to 10 year old mixed-gender students because they were at neither extreme of this age spectrum, young enough to still be relative computer novices, yet old enough to understand and respond well in our evaluation. We expect most of the students to have had some prior computer experience.

We received permission and support from the Superintendent and Technology Coordinator of a local elementary school to perform our evaluations there. We met with both individuals to discuss and coordinate recruitment and logistics details of our study with their school. As a result of our consultation, the

ages of our study target group shifted slightly to 10.5 – 11 year olds. The

Superintendent was concerned with the younger students' ability to understand

and approve of the Informed Assent Forms as well as their parents' approval of

their participation in the study. He believed that both recruitment and testing

would be more successful with his 5th grade students.

Method

Tests were performed with 24 of the 25 total students who consented to

the study (12 pairs). The first two pairs were selected to engage in the "free-

play" sessions while the remaining ten pairs were reserved for the writing

collaboration task. Testing was carried out with students from three classes of

5th graders over a two day testing period.

Following a brief introduction at the beginning of each session, the

students were separated and completed a verbal screening and pre-test

individually with a member of the testing team. The students were then reunited

in the main test room to perform in the evaluation before being separated again

to complete a verbal post-test survey (Appendices 3 & 4). After the individual

post-test interviews were completed the students were reunited one final time for

a less formal group question and answer session regarding their experience and

thoughts.

In the free-play evaluations, each student in the test pair was allowed to

freely use and experiment with an XO unit. The sessions were open format with

little direction or guidance and lasted 10 – 20 minutes. The students were

encouraged to speak out loud and were informed that they would talk and work with one another as much as they wanted. The test facilitator ended sessions early for participant pairs that appeared to have slowed or stalled in their XO exploration (exhibited by apparent lack of interest of non-productive dwelling in a single activity or program). The primary purpose of this evaluation was to collect information regarding participant first impressions, experiences, and feedback regarding the XO laptop.

In the writing task, the two students were asked to work collaboratively on re-creating a short text document (Appendix 1) using individual XO units that were connected to the same writing activity. The document consisted of two different colors of text (black and red) and the students were asked to only type text that was the same color as the playing card they were distributed (also used for participant identification). They were informed that they would be working together because the machines were "connected" and that they would be able to see what the other student was doing. They were told that they would were free to work together in any way, speak, move around, and that they did not have to take turns with these particular laptops. The manner in which they worked together to achieve the task (turn taking or simultaneously) was considered as an indication of collaborative success. The ability to match certain font formats presented in the original document also served as a measure of functional ease of use.

The first day of testing began with two free-play sessions, as intended. In between each session the test group, advisor, and Technology Coordinator

discussed minor timing and procedural issues and how to address them for subsequent tests. Four additional test pairs successively participated in the writing collaboration task before the end of the school session on the first day.

The writing collaboration test sessions continued on the second day with success until networking and connectivity problems arose during testing of the tenth pair. The XO units were re-booted and re-connected for the 11th Pair (Group ID: Jacks) but the connection problems persisted and worsened, making the shared writing activity impossible. The test facilitator converted the test session to a free-play session after approximately four minutes of writing collaboration. As a result of the networking difficulties, the final test pair (Group ID: Queens) was evaluated as a free-play session.

Upon arrival at the test site, the team was escorted to the designated testing room to set up equipment and test materials. A table large enough to accommodate two students was prepared with two seats for the children (side by side) and one for the test facilitator. In addition, a second table was set up for the individual screening and pre- and post-test surveys. This table was located in a smaller room adjacent to the main test room.

The testing team was then escorted to a classroom of students containing participants in the study where a short introduction to the team and test purpose was stated to the entire class. The testing team returned to the test room and, after prepping for the test session, sent a team member to retrieve a pair of students from the classroom. The classroom teachers were asked to assist in

the pairing of students to expedite testing procedures and also to ensure a compatible set of children.

Testing commenced in the following manner:

- Seat the children together for a brief introduction.

- Separate the children for the screener and pre-test surveys.

- Return children to the same table to perform evaluations.

- Separate the children for the post-test survey.

- Re-unite pair for brief, informal Q&A of their experience/thoughts.

- Allow children to return to their class.

When all testing was completed, the testing team reported to one classroom where all the children from each of the 5th grade classes were gathered. A brief explanation of the purpose of the study was given to the students and teachers and, at the Technology Coordinator's request, a summary of the OLPC project was shared. This was followed by a short question and answer period and a display of the XO units to the students and teachers.

Test Environment/Equipment

As outlined in the *User Profile* section, evaluations were carried out on-site at a local elementary school. The testing room was separate from the student classrooms and each participant pair was escorted from their class to the test room. The test room was an unused classroom reserved for our evaluations.

Two video cameras were used to document and record the test sessions. In addition, there were three XO units. While only two were used at a time for

testing, the third was continuously charging so that the battery from it could be "hot-swapped" with one of the testing units - allowing continuous usage of the unplugged XO's throughout all the sessions. Having the XO's unplugged during the testing process allowed the students to pick up and/or move their XO's during collaboration without any hindrance of being tethered to a wall or power strip.

Data was recorded with paper and pencil surveys and screeners. All of the surveys were verbally administered and recorded by a member of the testing team. In addition, a data sheet (Appendix 2) was used to tally and log events that transpired during the test sessions.

Task List

Free-Play Session

- Attempt navigation of the SUGAR interface

- Attempt to use certain programs within SUGAR

Writing Collaboration

- Complete typing of assigned colored text

- Replicate various types of font formats presented in the provided document

Evaluation Measures

Evaluation of the tests was measured qualitatively. Answers to the verbally administered pre- and post-test surveys were recorded, culled, and

compared (Appendices 5 & 6). Response tendencies and overall trends were described. In particular, the following items are discussed:

➢ Participant thoughts and experiences of the joint writing task.

➢ Children's comprehension of a shared activity.

➢ Properties of the writing program that affected collaboration efforts.

Results

Of the 12 pairs of students evaluated, 7 participated in a problem-free writing collaboration task, 3 engaged in free-play sessions, and 2 experienced connectivity problems during the writing collaboration. One of these two pairs was converted to a free-play evaluation mid-session.

Every student participant reported having prior experience with computers on the pre-test survey. The entire sample of 10 – 11 year olds reported using a desktop (only one claimed to have no laptop experience) at home, school, or another location. The frequency of computer use ranged from "every day" to "at least once a week" with the exception of two students who reported less frequent usage of only once or twice a month. Half the students reported computer usage time limits of 30 minutes, with 1/3 reporting limits of an hour or more. One student stated no parental time limit was imposed and admitted computer usage sessions of 5 hours or more.

Free-Play Sessions

There was virtually no collaboration during the first two, planned free-play sessions. Students individually explored the contents of the SUGAR interface. Most opened programs most familiar to them, such as Paint (a drawing program), Calculator, Browser (internet browser) and Chat. Programs that were not immediately visible on the activity bar lining the bottom of the screen (requiring side scrolling) were rarely opened. Students appeared to fixate and dwell on whatever program they had opened. Some continued to start new programs without closing down previous ones, which may have caused the XO to exhibit some lag.

The final session (Group ID: Queens) consisted of much collaboration between the students. They talked to one another, asked questions (to each other and the test facilitator) and helped each other understand the Chat program. They worked together to identify each other on the network, share their activity, and successfully connect on their own.

Writing Collaboration

Collaboration between students during the writing task was limited. All the students communicated with one another within their pairs during the test session but differed in the manner and frequency of communication.

All but one of the groups used pointing to convey messages. While every group spoke at least once during the task, only four (of seven) groups continued to speak to one another throughout the entire evaluation. Despite

encouragement to speak out loud and normally to one another, most of the groups who shared verbal exchanges did so in short bursts of low voices or whispers. One participant traced out a message with his finger on the table to the other student while another used the screen to type a message to the partner.

While it seemed apparent that every group realized they could type simultaneously, over half (four) of the groups continued completing the task in a turn-taking fashion until the session ended. Members from two different pairs deleted their text entries when they realized they had typed while the other student was writing their portion (the next in order) of the text document. During two sessions, one member of the pair edited previous text entries of the other student while they were typing the current portion of the text document (to match the template) – but otherwise did not type while the teammate was typing.

Incorrect typing, or a student typing text that was not of the color they were responsible for, was only witnessed in one group. The other member of the pair realized the mistake and informed the teammate – but the incorrect typing continued for the duration of the session (to the frustration of the other member).

Almost all (5 of 7) of the pairs were able to complete at least the bold formatting of a specific word as shown in the original text document template.

Post-Test Surveys

7 out of 16 of the students who were connected during their evaluation tasks (including the pair that was converted from write-task to free-play mid-

session) gave explicit comments revealing feelings of difficulty or confusion due to their connection with another student – specifically due to seeing someone else's work on their screen (Appendix 6). When asked to rate if it was "easy or hard" to work with another person on the task, 1/3 responded "hard". Two students said they preferred to *not* have the computers connected at all.

Despite these reports, over 80% of the children reported in individually that they liked the laptop overall. Half the students from both free-play and writing collaboration tasks rated the overall ease of use of the computer as "easy". Still, 1/3 of them reported overall use as "hard".

When asked about their feelings about the XO, answers gravitated towards the physical aspects of the machine, itself. Common answers repeatedly referred to the small size and "portability", the child-oriented design, and the features that made it different from a "normal" computer (the handle, colors, antenna, etc).

Discussion

<u>Writing Collaboration Task</u>

Using the write program as a shared, collaborative activity was a difficult task for these 5th grade children. Though the children were all informed that they would be working together and could see each other's work, it is possible that they misconstrued this information to mean that those things were possible because they were seated side by side. Three pairs of students gave a visible response of surprise when the statements about working together and seeing

each other's work was given, leading us to believe they realized the possibility before they began the task. The children's performance during the task, however, revealed that they did not fully grasp the concept of the shared activity right away. One pair had worked for approximately 8 – 9 minutes before one student realized what she was typing appeared on the other user's screen. What followed was a process of testing and confirmation as they took turns pressing keys on their own XO unit while watching to see if it appeared on the other XO screen.

The children expressed confusion from the joint writing activity, stemming from the uncertainty about the other user's text appearing on their screens. Those that did understand the source of the text still had trouble distinguishing between the two separate user's inputs. There was some apparent difficulty positioning cursors and typing in two separate places within the same document. Some expressed that they would prefer the computer *not* be linked at all. Despite the ability to work simultaneously, some pairs chose to work by turn-taking.

It should be noted that students are taught the importance of taking turns in school and when working together. This was verified to be true for our sample of students by speaking to the Superintendent and Technology Coordinator of the school. Both individuals confirmed how this concept was stressed and pervasive in lessons taught at their school. Despite efforts to express that they need not do so for the task at hand, this tendency persisted. Some children actively deleted lines after writing them "out of turn" and they were often heard

making references to taking turns ("It's your turn".). In addition, the writing task itself is a serial one (text and stories are written in a certain order) – an inherent property which may have caused the students to take turns even though the ability to work simultaneously was possible.

At the time of testing, the SUGAR interface and its activities were still prone to connectivity problems, as noted on multiple occasions from our own experiences. This issue arose during our pilot study, and again during our test sessions – forcing us to stop one pair mid-session. While those connectivity problems within the Write program were intermittent and unpredictable, they were consistent among the other activities we preferred to use in our evaluation. Our first choice for examining the collaborative aspects of SUGAR and the XO was the Paint activity. We had hoped use a task almost identical to our writing task, asking two students to work together to recreate a simple picture composed of multiple shapes. Benefits of that task over the writing one include minimal keyboard and/or typing experience, a less cognitively demanding activity (drawing vs. writing). The most important difference and benefit, however, is that the task does not carry the same inherent turn-taking and serial order processing present in a writing task. Future studies on XO collaboration may take advantage of a more stable Paint program to examine how children work together when order is not requisite native to the task being performed.

In addition, future work using the Write program may make additional changes to counter the turn-taking effects inherent in the program and encourage more collaboration between users. One of these changes may be to have the

users work on a single copy of a target document or template. In this study the children were each given an identical copy of the same template. When sitting next to one another there was little room between the two XOs to place the documents so each student had their copy on their far side. This required them to repeatedly look away in the opposite direction of their partner to continually reference the document. Providing them with a single copy and placing it between them may foster more teamwork as they are drawn closer together, working on a common artifact, and may point things out to one another.

The concept of activity collaboration was best solidified when the students could see the effects they had on other XO first-hand. Despite being informed that they would be able to work together because the computers were linked and that they could see the other person's work, most of the children did not fully grasp this until they noticed what they typed appearing on the other user's screen. It is possible that some students proceeded through most of, if not the entire, session without fully realizing the ways they could work together. We may have been able to overcome this in our study by taking a few moments to demonstrate to the students how this feature was manifested on both XOs.

Free-Play Sessions

We felt that we did not allot enough time for the children to "play" with and truly experience the XO. This was a brand new and novel device with an unfamiliar interface that presented many exploration opportunities to the children. We discovered a tendency for the child to open a program and dwell in it for a

period of time, leaving less time for investigation into other areas and activities of SUGAR.

Allowing more exploration time and actively engaging the users as they worked by asking them what they were attempting to do may lead to more complete and insightful post-task survey answers, thoughts, and comments. One child may hear something from the other that could spark their interest or lead them to help in solving a problem. When one student from the "Queens" test pair responded to the test facilitator's inquiry that they were attempting to use the Chat program, the other child actively sought out the activity and they soon began collaborating to learn how to use it.

The students tended to open and experiment with activities most familiar to them – those they could recognize from their icons. Some of the most commonly opened programs included: Paint (brush and palette), Chat (cartoon text bubble), Calculator, and Browser (Internet). Those activities with more ambiguous ones icons were opened less (or not at all), such as Record (eye icon), Pippy (programming activity with a snake icon), and Etoys (star icon).

In addition, those activities that were not immediately visible across the bottom of the home screen were also rarely opened. Activities and programs are that required scrolling to see were experimented with least because they were not readily available. Future versions of SUGAR could possibly "remember" which programs are most frequently used by the XO's user and re-organize the activity bar so that they are placed in the default view and are readily accessible.

In addition, those programs that are most likely to be used could be placed on this "main area" of activity bar by default.

Testing with children

The children were reluctant to openly communicate with one another in these evaluations. This was understandable and expected in the free-play sessions as the children were pre-occupied with the exploration of a new product. However, during the writing collaboration few pairs communicated openly – even after explicit instructions that they could work with and speak to one another. Those pairs that did communicate spoke in low whispers and through other means, such as shoulder tapping, pointing, on-screen messages, and even tracing out messages with their fingers on the table.

The children were affected by the testing group members and observers, possibly hindering collaboration attempts. It was observed in at least two sessions that communication between the students increased when the test facilitator was out of view (in the other room). Often times a student glanced at the facilitator as if he/she wanted to speak but was apprehensive about doing so in front of him. These testing conditions may have adversely affected any collaboration that would have occurred.

In contrast to traditional testing situations in which the test facilitator would attempt to remain "neutral", doing as little as possible to interact with (and thereby influencing) the participant(s), we believe these evaluations should attempt to engage children more to put them at ease. A goal of this study was to

observe the ways that students work together and collaborate while working with the XOs, but this became difficult when the children were reluctant to work freely in front of the testing group.

During the final test pair (Group ID: Queen) the children were already being retrieved for the evaluation when the other testing group members realized some test papers were mis-placed. When the children came into the testing room we were not ready to begin testing. As a result, the test facilitator openly spoke to the children while the other group members retrieved the missing papers. There was some casual talk about the school lunch and the end of the school day approaching. After a few minutes we were ready to resume testing and began the evaluation. This pair was THE most openly communicative pair of students, engaging one another and even the test facilitator multiple times throughout the session. They discovered how to identify each other on the mesh network, start and share the Chat activity explicitly with one another, and successfully connected. We believe the open dialog between them and the facilitator during the session (the facilitator inquired with them about what they were doing and how they knew about the things they mentioned) contributed greatly to the collaboration. In addition, we believe the casual environment created when they initially came into the room and conversed openly with the test facilitator allowed them to feel more comfortable and acclimate to the test conditions more than any other group.

Participant Comments/Thoughts

When asked open questions about their thoughts on the XO laptop, many children focused on its physical properties. The children repeatedly referenced its unique design and colors. In addition, many students who reported liking the XO cited its small size and portability as the reason. They pointed out how easy it would be *for them* to carry around to do work on, especially with the built in handle. They seemed fascinated that the XO was designed with them in mind and could "see" themselves using it.

The students made frequent comparisons to "normal" computers when explaining their responses of likes or dislikes of the XO. Some stated that the familiarity and similarity of function, such as keyboard layout, and the availability of programs and internet access, were positive aspects of the XO. Other students also cited *differences* from standard laptops as reasons they liked the XO. They enjoyed the unique, custom appearance, smaller size, and weight – all leading to the feeling that the laptop was made for them (children). This is especially relevant considering the vast majority of the true target population for XO distribution have no prior computer experiences from which to make comparisons.

After the conclusion of the final evaluation session, the testing group spoke to a classroom filled with all the 5th graders from the school about the usability test and the OLPC project in general. There was much excitement and interest from the children, even those that had participated in the evaluations. The students and the teachers all asked questions about the XO and the

program, with the students repeatedly inquiring about how they could own one. While the physical appearance of the XO attracted the students, many of them were amazed by the possibilities of using the laptop. They were interested in how they could easily carry it around, work at school and at home, and the programs that were available on it. Most interestingly, they were wide-eyed and intrigued when we explained how their classmates had helped us investigate the collaborative sharing aspects of the XO.

Conclusion

The OLPC Project's XO laptop and SUGAR interface are still in their infancy, vulnerable to issues that plague virtually all hardware and software development. We have attempted to investigate the effectiveness of the ideal of collaboration that is one of the primary foundations of the OLPC venture. We understand that the software is still under development and that our findings were consequently affected by this but hope that our work has laid some groundwork for others to build upon. Admittedly, our examination of the collaborative aspects of a specific piece of software was also an exercise in the collaboration of many people, from our testing group and advisor to the Administration of an elementary school.

Any work in this area is intricately bound to studies of child and social psychology but we believe important issues with the XO, SUGAR, and the target group of children were brought to light for others to consider. Fortunately, there are nations of people who firmly believe in and wholly support the OLPC Project to continue work in achieving its goal.

Appendix 1: **<u>Writing collaboration text document template</u>**

An excerpt from

<u>Oh, the Places You'll Go!</u>

Dr. Seuss

Random House, New York; 1st edition (January 22, 1990)

(On the following page)

Congratulations!
Today is your day.
You're off to Great Places!
You're off and away!

You have **brains** in your head.
You have feet in your shoes.
You can steer yourself
Any direction you choose.

You're on your own.
And you know what you know.
And **YOU** are the guy
Who'll decide where to go.

You'll look up and down the streets.
Look 'em over with care.
About some you will say,
"I don't choose to go there."

Appendix 2: **<u>Data collection sheet</u>**

Evaluation date: ____/____/____
Start time for this session: ____:____

Participant ID: Card:____/Suit:_____   Participant ID: Card:____/Suit:_____

HELPING

of times student **helped** partner _____
# of times student **asked** for help_____

Helped by pointing at partner's screen? ☐ Yes   ☐ No
Helped by verbal explanation? ☐ Yes   ☐ No
Helped visually with their own cursor? ☐ Yes   ☐ No

ERRORS

of times student student changed screens: _____
   - details_____
# of times student student closed screen w/ "**X**": _____
Misc MENU activity: _____
_____
_____
Other actions: _____
_____
_____
_____

TASK SUCCESS

Succeeded in working in parallel: ☐ Yes   ☐ No
Time when first out of order typing occurred: _____

# of Individual Lines completed CORRECTLY _____
# of Individual Lines completed IN-CORRECTLY _____

BOLD formatting completed? ☐ Yes   ☐ No
UNDERLINE formatting completed? ☐ Yes   ☐ No
HIGHLIGHTED formatting completed? ☐ Yes   ☐ No

FREE-PLAY

Attempted to use hinge as latch? ☐ Yes   ☐ No
Required assistance opening laptop? ☐ Yes   ☐ No
Time to successfully open laptop: _____

MISC

Student cried? ☐ Yes   ☐ No
Student gave up/ended work? ☐ Yes   ☐ No
Student reactions: _____
_____

OVERALL PAIR RATINGS

Writing Task fully completed with partner?
 ☐   **Yes**   ☐   **No**

Appendix 3: **<u>Free-Play Session Post-Test Survey</u>**

(Beginning on the following page)

Post-Test Ratings – Free-Play Session

(This survey is not to be distributed to the child, but instead **verbally** conducted.
The test conductor will record the answers below.)

1) Do you like this laptop computer?

☐ **Yes**   ☐ **No**   ☐ **Other** _____

Why is that?

_____

_____

_____

2) Do you like how it looks?

☐ **Yes**   ☐ **No**   ☐ **Other** _____

What about it makes you say that?

_____

_____

_____

3) What did you try to do with the computer?

_____   _____

_____   _____

_____   _____

_____   _____

4) Do you think it was easy or hard to do those things?

☐ **Easy**   ☐ **Hard**   ☐ **Other** _____

What about it makes you think that?

_____

_____

_____

5) If you could change something about this laptop, what would it be?

_____
_____
_____

6) If we had more time, would you want to keep using this laptop?

☐ **Yes**   ☐ **No**   ☐ **Other** _____

Why is that?

_____
_____
_____

7) Is there anything else you feel about this laptop or what you did today that you could share with me today? I'd like to hear anything you think.

_____
_____
_____
_____
_____
_____

Appendix 4: **<u>Writing Collaboration Session Post-Test Survey</u>**

(Beginning on the following page)

Post-Test Ratings – Writing Collaboration Task

(This survey is not to be distributed to the child, but instead **verbally** conducted.
The test conductor will record the answers below.)

7) Did you think that it was easy or hard to do what I asked you to do on the laptop?

☐ **Easy**   ☐ **Hard**   ☐ **Other** _____

Why is that?

_____

_____

_____

8) Do you like this laptop computer?

☐ **Yes**   ☐ **No**   ☐ **Other** _____

Why is that?

_____

_____

_____

9) Do you like how it looks?

☐ **Yes**   ☐ **No**   ☐ **Other** _____

What about it makes you say that?

_____

_____

_____

10) Overall, do you think this laptop is easy or hard to use?

☐ **Easy**   ☐ **Hard**   ☐ **Other** _____

What about it makes you think that?

_____

_____

_____

_____

11) If you could change something about this laptop, what would it be?

_____

_____

_____

12) If we had more time, would you want to keep using this laptop?

☐ **Yes** ☐ **No** ☐ **Other** _____

Why is that?

_____

_____

_____

7) Is there anything else you feel about this laptop or what you did today that you could share with me today? I'd like to hear anything you think.

_____
_____
_____
_____
_____

_____

Appendix 5: **<u>Pre-Test Survey Response Summary</u>**

(Beginning on the following page)

Pre-Test Survey Response Summary

Test Pair	Trial Time (minutes)	Participant ID	Age	Grade	Languages Spoken	Family Origin	Any previous computer experience?	Was it a Desktop?	Was it a Laptop?	Have you used one at home?	Have you used one at school?
Ace	17	AC	11	5	English	Don't Know	Yes	Yes	Yes	Yes	Yes
		AD	10	5	English	Don't Know	Yes	Yes	Yes	Yes	Yes
Two	16	2C	11	5	English	Poland	Yes	Yes	Yes	Yes	Yes
		2D	11	5	English	Canada	Yes	Yes	Yes	Yes	Yes
Three	17	3C	11	5	Eng/French	Germany	Yes	Yes	Yes	Yes	No
		3H	10	5	English	Don't Know	Yes	Yes	Yes	Yes	Yes
Four	20	4H	11	5	English	Germany/Finland	Yes	Yes	Yes	Yes	Yes
		4C	11	5	English	Germany/England	Yes	Yes	Yes	Yes	Yes
Five	20	5S	11	5	Eng/Spanish	Texas, NY	Yes	Yes	Yes	Yes	Yes
		5H	11	5	English	Africa/Jamaica	Yes	Yes	Yes	Yes	Yes
Six	19	6C	11	5	English	NY/PA	Yes	Yes	Yes	Yes	Yes
		6D	10	5	English	France	Yes	Yes	Yes	Yes	Yes
Seven	18	7S	11	5	English	Germany	Yes	Yes	Yes	Yes	Yes
		7D	11	5	English	Don't Know	Yes	Yes	Yes	Yes	Yes
Eight	17	8S	10	5	English	Germany	Yes	Yes	Yes	Yes	Yes
		8H	11	5	English	Dutch	Yes	Yes	Yes	Yes	Yes
Nine	30	9S	10	5	English	Don't Know	Yes	Yes	Yes	Yes	Yes
		9H	10	5	English	NY	Yes	Yes	Yes	Yes	Yes
Ten	26	10S	11	5	English	Africa/Germany	Yes	Yes	No	No	Yes
		10H	11	5	English	Italy	Yes	Yes	Yes	Yes	Yes
Jack	15	JC	11	5	English	Don't Know	Yes	Yes	Yes	Yes	Yes
		JD	11	5	English	Italy, Scotch Irish	Yes	Yes	Yes	Yes	Yes
Queen		Q	11	5	Eng/Spanish	Jamaica/Puerto Rico	Yes	Yes	Yes	Yes	Yes
		Q	11	5	English	Ireland	Yes	Yes	Yes	Yes	Yes

Pre-Test Survey Response Summary

Test Pair	Have you used one anywhere else?	The computer at home - who does it belong to?	How often would you say you use a computer?	When was the last time you used a computer?	Do you have a time limit?	How long is that limit?
Ace	Yes	Each person has their own	Once every few days	Yesterday	Yes	1 hr +
	No	Family	Once per week	A couple Day ago	Yes	1 hr +
Two	Yes	Family	Once per week		30 min	30 mins
	No	Family	Every day		No	20 mins
Three	Yes	Family	Once every few days	Yesterday	No	1 hr +
	Yes	Family	Every day	Yesterday	Sometimes	30 min - 1 hr
Four	Yes	Family	Twice/day	Yesterday	Yes	1 hour
	No	Family	Once every few days	Yesterday	Yes	30 mins
Five	Yes	Family	Once every few days	A few days ago	No	30 mins
	Yes	Family	Every day	Yesterday	No	
Six	Yes	Family	Once a day		n/a	30 mins
	Yes	Family	Once every 2 weeks		Yes	1 hour
Seven	Yes	Family	Once every few days		Yes	30 mins
	Yes	Family	Every day		No	5 hours
Eight	Yes	Family	Every day		Yes	30 min - 1 hr
	Yes	Family	Once every few days	Yesterday	Yes	30 min - 1 hr
Nine	No	Family	Once every few days		No	
	Yes	Share with a brother	Every day		Yes	30 mins
Ten	No		Less once/week		No	
	No	Family	Once every few days		Yes	30 mins
Jack	Yes	Family	Every other day		No	15 mins
	Yes	Family	Every day	Yesterday	No	
Queen	Yes	Share with a sister	Once every few days	A few days ago	No	30 mins
	Yes		Once a month	Today	No	30 mins

Pre-Test Survey Response Summary

Test Pair	When you use the computer, what kinds of things do you do on it? (items before the semi-colon were volunteered freely, items after the semi-colon were verified by student after facilitator read from a list)	Additional Usage Comments (after further prompting)
Ace	Games, YouTube, Chatting; Instant Messenger, Surfing the Internet, Watching Movies, Video Games (Crazy Monkey Games), some membership emails.	Downloading Videos
	School work; Writing, Drawing, E-mail, Video Games	N/A
Two	Look up homework; Writing	N/A
	Homework, Writing, CD Video Games	N/A
Three	Looks at pictures of sports and hobbies; Writing, Drawing, Surfing the Internet, Watch Movies, Games	N/A
	Drawing, CD Video Games, Solitaire; Writing, Instant Messaging, Video Games, Surfing the Internet sometimes.	N/A
Four	Online games; Runescape (game); writing, drawing, internet surfing, instant messenger, email, movies, video games	N/A
	Visit websites for kids, play games; writing, internet surfing, movies	N/A
Five	Homework, typing, video games; drawing, internet surfing	N/A
	Games, typing, send messages; drawing, internet surfing, IM, movies, video games	N/A
Six	Wweb cams; writing, drawing, internet surfing, IM, email, movies, video games	YouTube
	Research, Nick.com games; drawing, Google	YouTube
Seven	Writing, internet surfing, video games (Club Penguin)	N/A
	Club Penguin, YouTube, Yahoo! email, MySpace; writing	Watch a live bird-cam
Eight	Web cam, kid pics; writing, drawing, internet surfing, email, movies	N/A
	Games, typing, research; watch movies, "AddictingGames.com	N/A
Nine	PowerPoint, YouTube; writing, internet surfing, IM, email, video games	N/A
	YouTube, Webkinz; internet surfing, email, IM	Limewire to DL songs, wikipedia, research.
Ten	Homework, Writing, CD Video Games	N/A
	Webkinz, "build-a-bear", "appropriate stuff for kids my age", writing, drawing, research	N/A
Jack	Videos; writing, drawing, internet surfing, movies, video games	N/A
	YouRube, Google, online games; writing, internet surfing, IM, email, movies, multiplayer online	N/A
Queen	Homework; writing, internet surfing, email, movies, video games	N/A
	School work, games; writing, internet surfing, youtube, Runescape (game)	N/A

Appendix 6: **<u>Post-Test Survey Response Summary</u>**

(Beginning on the following page)

Post-Test Survey Response Summary

Test Pair	Participant ID	Was the writing collaboration hard?	Why is that?	Do you like this laptop computer?	Why is that?
Ace *	AC	n/a	n/a	Yes	Drawing on this is better than 'kidpix'.
	AD	n/a	n/a	Yes	It was fun… the writing, drawing, & internet.
Two *	2C	n/a	n/a	Yes	It's different from regular computer.
	2D	n/a	n/a	Yes	There's lots of fun stuff, like painting.
Three	3C	Easy	Like the padded keys, options like bold & underline are easy to use.	Yes	It's small, and it can still do what other laptops can do.
	3H	In between	Different from what I'm used to, bold/underline hard to find at first.	Yes	It's small, easier to use, portable, & probably won't break cuz it's "squishy".
Four	4H	Not that hard	…But keys are kind of small.	Yes	Like the looks, bold/underline easy to find at the top.
	4C	Harder than normal	Keys are small.	Yes	The "safety features" (rugged design), it's portable, swivels, rubber, won't break.
Five	5S	Hard	Words just kept appearing.	Other	Was hard to see the letters.
	5H	Easy	We couldtalk to each other but hard typing on each other's screens.	Yes	Friends can type with you and can help each other.
Six	6C	Easy	Used to using computers.	Yes	The bold option is right in front of you.
	6D	Kind of hard	Scrolling was confusing, using a mouse would be easier, not used to rubber keyboard, deleted words by accident.	Kind of	It "gets the job done".
Seven	7S	Easy	I've used laptop before.	Yes	It's cute and tiny.
	7D	Hard	Usually don't have to type together, sometimes I pressed a key and it didn't type. Keys are small	Yes	It's lighter and more portable (than regular computers).
Eight	8S	Easy	Different than keyboard at home.	I think so	There were enough things to click on… not too many to click - just enough.
	8H	A little weird	The words kept moving back and forth w/ two people	Yes	It's smaller.
Nine	9S	Easy	But hard to type on small keys.	Yes	It's different & I like the rubber keys.
	9H	Hard	Hard to line up words, but finding "bold" was easy.	Yes	It's small but screen isn't too small. It's portable and I like the keys.
Ten **	10S	Hard	Computers were connected and the writing on both screens was confusing.	Yes	Would like it more if it blinked or if it didn't erase so much.
	10H	A little hard	Couldn't get lines to line up - my lines were behind hers.	Yes	Keyboard is soft and kids won't pound it.
Jack ***	JC	<canceled collaboration>	n/a	Yes	Very different from normal computers but still has Google so it's kinda normal. It glitches w/ note pad (Write) linked.
	JD	<canceled collaboration>	n/a	Yes	Small and "nifty" (handle), rubber keys are smooth.
Queen *	Q	n/a	n/a	Yes	It's fun - has paint and chat.
	Q	n/a	n/a	Yes	Portable for kids.

* Free-Play Sessions.
** Writing Collaboration trial experienced networking difficulties - connectivity was intermittent.
*** Writing Collaboration connection broke down mid-trial. Task converted to free play session.

Post-Test Survey Response Summary

Test Pair	Do you like how it looks?	What about it makes you say that?	What did you try to do with the computer?	Was it easy or hard?	What about it makes you think that?
Ace *	Yes	Looks cool, like the handle.	Paint	Hard	Hard to control (needs a mouse).
Two *	Sorta	Has a good design.	Paint, Write	Both	Needs a mouse, closed things by accident, has good "reaction" in writing.
	Yes	Like the color and design.	Write, clicked around.	Neither	<none>
	Yes	Like the bumps, green color.	See what was on it, painting, calculator.	Easy	In paint you just click and it "shows up". Calculator was easy to click or type numbers.
Three	Yes	The color is pretty cool.	n/a	Easy	Better than other laptops.
	Yes	Like the (XO) logo and antennas.	n/a	Easy	Keyboard is familiar.
Four	Yes	It's smaller - easier to carry; like the handles.	n/a	Easy	<none>
	No	The color of logo/green color.	n/a	Easy	Like the cursor control, buttons easy to get hang of.
Five	I Guess	I like small size but makes it harder to type.	n/a	Easy	It would be easier if not connected (networked).
	Yes	Like the (XO) logo and color green.	n/a	Easy	It has all features of regular laptop but smaller.
Six	Yes	The logo is cool, but want it in pink.	n/a	Other	<illegible>
	No	It's looks like and reminds me of Leap Frog (dumb).	n/a	Medium	Scrolling was really hard, but it was easy to find bold & underline.
Seven	Yes	Like the style, color.	n/a	Easy	<none>
	Yes	It's cool, green is my favorite color; like the handle and "pads". **But it's bad because people can "steal your ideas".**	n/a	Hard	It will get easier when you get used to it.
Eight	Yes	It's pretty and handy.	n/a	Confusing	<illegible>
	Yes	Like the small keys.	n/a	Hard	Harder to type than regular laptop.
Nine	Yes	Like the colors green & white.	n/a	"Good"	Will get used to it.
	Yes	It's different - like the texture and color is. It's different from other computers.	n/a	Easy	Easy to get used to.
Ten **	Yes	Like the soft green part (antenna) and didn't have to press down hard to type.	n/a	Hard	The cursor. I didn't know what to click.
	Yes	Looks kid friendly, easy to use & kids can use in school. It has stuff other computers don't have (showed the border pop up).	n/a	Easy	**The "de ja vu" thing was happening (due to network problem). I thought it was a "glitch to test us".**
Jack ***	Yes	Logo, design texture, surprised it had Google, has a handle to carry it.	Search in Google.	Easy	Like the soft keys.
	Yes	Like the color theme.	Paint, go on Google.	Hard	Paint was hard to use.
Queen *	Yes	Like the keys, screen.	Chat, draw a picture, calculator.	Hard	**Kept clicking chat - didn't go (connect) to the other computer.**
	Yes	Like the logo in different colors.	Chat, browse for games.	Hard	**Couldn't figure out how to send a message (Chat) or start and end things. Computer was new to me.**

* Free-Play Session
** Writing Collabor
*** Writing Collabor

Post-Test Survey Response Summary

Test Pair	If you could change something about this laptop, what would it be?	Would you keep using it?	Why is that?	Is there anything else you feel about this laptop or what you did today or what you did today that you could share with me today? I'd like to hear anything you think.
Ace *	Add a mouse.	Yes	Finish drawing.	What is "chat", does this have any wireless?
	How you change (move between) programs.	Yes	Need time to finish drawing.	It needs a mouse to move easier.
Two *	<none>	Yes	<no reason>	<none>
	Make it (cursor) easier to move.	Yes	It's fun.	<none>
Three	<illegible>	Yes	<no reason>	<none>
	<none>	Yes	Like the feel & it's smaller.	<none>
Four	Make the keys bigger.	Yes	I liked the typing.	<none>
	Make the keys bigger.	Yes	Easier than going to desktop (computer) to work. Can chat and use camera for video.	<none>
Five	Move the screen back.	No	Not used to being on computer long.	It was hard to work together - confusing. But it was easy because you didn't have to set it up (connection).
	Stop the border pop up.	Yes	It's fun to use.	<none>
Six	Make the handle wide(r).	Yes	It's "just cool".	It was pretty cool; enjoyed it. Cool to see what other person is typing. But I couldn't tell what the scroll thing was.
	Change the rubber keys, screen was too dark.	Kind of	<no reason>	Need a mouse to move easier. Make the scrolling easier.
Seven	Didn't like how computers were connected - any mistakes other person made showed up on mine.	Yes	I like the feel of keys when typing.	Wish more laptops were like this, with a handle to carry around. Can get a bag to match the XO (logo). It was cool & fun, smaller and awesome! It was "funny" working together at same time - hard to figure out at first. Looks (physically) like a video game (Game Boy).
	Make the keys easier to press.	Yes	"It's new and people will want it - people always want the newest technologies." "It's easy to move around w/ the	Like the texture - most laptops don't have it. Like green keys.
Eight	The X button (on keyboard has no functionality).	Yes	"Want to make it perfect" and see what else it can do.	It's cool. Glad to miss out on class to come up here. It was harder to work together because other person's stuff is on your screen, but got better towards the end. I could use it because it's small and easy to carry around.
	"Not much".	Yes	Smaller keys let me type faster.	<none>
Nine	"Keep it the same because you will get used to the small keys.	Yes	<no reason>	Was cool to try something new, but hard to work together. Will use again because it's small and portable with a handle.
	Make it in different sizes - some bigger and some smaller.	Yes	Kinda fun and different; new.	Like the things (menu) along the top. Like that it's easy to see and do stuff.
Ten **	Not make it connected to the other computer and use a mouse.	Yes	<no reason>	It was fun and cool, can use it like a regular laptop and it's portable to take to work.
	<none>	Yes	Try to finish what we were doing, see what else it can do.	<none>
Jack ***	Download games to play, connect to library to download and read books.	Yes	Easier to use than normal, faster than a desktop (E-machine).	It was fun to look at stuff. Writing was a little hard with both (students) showing on the same screen it was confusing. Needed more time. Icould use in the future when bored or for work.
	<none>	Yes	Try the "turtle" program.	<none>
Queen *	Give it a chat bubble.	Yes	It's fun, try chat some more because it didn't work.	<none>
	Colors were too plain.	Yes	Explore more and try to talk (chat".	Like the laptop; had fun trying to look through it.

* Free-Play Sessic
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